

STANDARD

IRRIGATION PIT (No.)

Definition

A small storage reservoir constructed to regulate or store a supply of water for irrigation.

Scope

This standard applies to open pits excavated below the ground surface to intercept and store either surface water or unconfined groundwater for irrigation. It applies to pits if part of the water is impounded above natural ground, provided that the depth of water above the ground surface, as measured at the spillway crest elevation, does not exceed 3 ft.

This standard establishes the minimum acceptable level for the planning and functional design of irrigation pits. It does not include detailed criteria or construction specifications for individual pits or components of the storage facility.

Purpose

To collect and store water until it can be used beneficially to satisfy crop irrigation requirements.

Conditions Where Practice Applies

This practice applies only to sites meeting all the following criteria and conditions:

1. The existing water supply available to the irrigated area is insufficient to meet conservation irrigation requirements during part or all the irrigation season.
2. Construction of an irrigation pit is the most practical means of obtaining a needed additional supply of water.
3. An adequate supply of good quality water is available for storage from surface runoff, streamflow, or from a subsurface source.
4. Topographic, geologic, water table, and soils conditions at the site are satisfactory for the feasible development of the irrigation pit.
5. If surface runoff enters the pit, the contributing drainage area is or can be protected against erosion so that normal sedimentation does not materially shorten the planned life of the pit.

Planning Considerations for Water Quantity and Quality

QUANTITY

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and groundwater recharge.
2. Effects on downstream flows or aquifers that would affect other water uses or users.
3. Potential for irrigation water management.

QUALITY

1. Effects on erosion and the movement of sediment, pathogens, and the soluble and sediment-attached substances carried by runoff.
2. Effects on the movement of dissolved substances to groundwater.
3. Short-term and construction-related effects on the quality of downstream water courses.
4. Potential of uncovering or redistributing toxic material.
5. Effects on wetlands of water-related wildlife habitats.
6. Effects on the visual quality of water resources.

Design Criteria

CAPACITY. Irrigation pits shall be designed to have a usable capacity sufficient to satisfy irrigation requirements in the design area throughout the growing season of the crop or crops being irrigated. In computing capacity requirements, due consideration shall be given, where applicable, to groundwater inflow, surface runoff, precipitation, evaporation and seepage. Additional capacity shall be provided as necessary for sediment storage. The usable capacity of a pit that depends wholly on groundwater as a source of supply shall be that part of the pit that is below the static water level.

PIT DESIGN. Irrigation pits shall be designed according to the criteria for excavated ponds in the standard for ponds (378).

OUTLET WORKS. Suitable outlet works shall be provided for the controlled release of irrigation water. The capacity of the outlet works shall be no less than that required to provide the outflow rate needed to meet peak period irrigation system demands.

Plans and Specifications

Plans and specifications for irrigation pits shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.

Irrigation pits shall be constructed according to the specifications for ponds (378).

Design Criteria

Irrigation pits shall be designed to meet the additional requirements in the Massachusetts standard for Pond (378), Excavated Ponds Design Criteria.

Irrigation Pit Specifications

The Massachusetts Construction Specifications for Excavated Ponds in the specifications for Pond (378) shall be used as the basis for construction specifications for irrigation pits.